Time For a (Gardening) Break: Impacts Of a Green Exercise Initiative For Staff Health And Wellbeing in a Corporate Environment

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Workplace health remains high on the agenda for many employers today, not simply due to extant legislative requirements but also the business-related costs of unchecked psychological and somatic health problems within a workforce. Although a robust body of literature has emerged in recent years indicating that absenteeism, presenteeism, low staff morale, reputational damage and reductions in overall turnover can be all be corollaries of businesses failing to engage sufficiently with workplace health issues, rather less research has directly investigated the efficacy of "green exercise" interventions for combating such problematic outcomes in corporate environments. Given the above, this paper reports findings from an ethnographic study of a green exercise initiative ("Green Minds") devised for staff at a single campus-based university in the UK. Specifically, the research sought to elucidate and "unpack" the health and wellbeing impacts reported by N=7 (mean age 52.29. mean years of service 12.86) participants across the course of their engagement with the initiative itself, with a specific focus upon the mediating and moderating factors involved. Participants were interviewed while actively taking part in the embedded activities, and again after the initiative "closed" for an indefinite period (due to the COVID-19 pandemic). Additionally, the two field-investigators on the research team took reflective notes and collected photographic evidence to augment these interview data. Five core themes emerged from the analysis: (1) Nature-based collective activity as a useful and necessary "escape" from work-related stressors; (2) Social connectedness was enhanced as a result of participation in the project; (3) Beneficial impacts upon individual health and wellbeing, themselves related to (4) Self-empowerment, and; 5) Exclusivity and inclusivity factors were reflected upon. The reported everyday benefits of participation in this form of activity suggest employers might consider developing group-based green exercise opportunities for staff as a useful, and relatively inexpensive, contribution to corporate goals relating to workplace health.

Introduction

It is well-established that staff presenting with ill-health can have serious fiscal implications for employers, notwithstanding those for the staff themselves. In the UK, Parsonage and Saini (2019) estimate that mental ill-health alone - typically in the form of anxiety, hypertension, depression and other stress-related conditions - presently costs in the region of £35bn per annum, the equivalent of around £1300 per employee operating within the UK economy. The most significant component of this annual total (just over £21bn) is due to "presenteeism", i.e. individuals continuing to work while below-capacity; this is double the cost of actual absenteeism due to stress-related illness (around £10bn), while the remainder is accounted-for by staff leaving employment altogether. The latter is further corroborated by the UK's Department of Work & Pensions, which reports that up to 300,000 people with long-term mental health problems lose or leave their jobs each year (Farmer & Stephenson, 2017). Vitality's 2018 Britain's Healthiest Workplace study, developed in partnership with RAND Europe and the University of Cambridge, similarly places the UK's annual economic cost of mental ill-health at £38bn, while estimating that a further £43bn is lost to somatic problems associated with jobs themselves (including musculo-skeletal disorders such as lower back pain, which can express in both active and sedentary roles), and more commonly to physical ill-health linked to negative lifestyle factors such as poor sleep, poor diet, lack of exercise, excessive drinking and smoking (Hafner, Stepanek, Iakovidou, & Van Stolk, 2018). Indeed, a key factor driving current poor

workplace somatic health is widely recognized to be the increasingly sedentary nature of many professional roles themselves, which are seldom offset by an equivalent increase in physical activity (henceforth PA) outside of the working domain (Pretty, Rogerson, & Barton, 2017).

These stark contemporary statistics emphasize an increasingly acute need for employers of all sizes to maintain the welfare of their employees in a holistic way, via the kinds of effective corporate health strategy that have been advocated in academic circles for some decades (Baker et al., 2008; Bertera, 1990; Loeppke, Edington & Bég, 2010; Dugdill, Brettle, Hulme, McCluskey & Long, 2008). As Wills and Naidoo (2016) compellingly argue, recognizing that the workplace is a social system in itself, and one that can both positively and negatively impact upon health, is an important foundation upon which to build interventions that target not only individual lifestyle behaviors, but also promote healthier collective working cultures. Directly supporting employees with mental health problems (e.g. via counselling), facilitating opportunities for PA, fostering a regular "take a break" mentality during the working day, and encouraging active transportation (cycling or walking to work) are all useful interventions. In addition, promoting healthy eating, providing health education and generally creating a positive, supportive motivational culture and climate at work all have the potential to enhance employee health and wellbeing, and by extension the capital wealth of the involved businesses themselves (Harden, Peersman, Oliver, Mauthner, & Oakley, 1999; Hubley, Copeman, & Woodall, 2013; Schröer, Haupt, & Pieper, 2014).

Perhaps surprisingly, given the above, it is only really in the last two decades that the workplace has become an explicit vehicle for promoting health in the UK, via both public and private initiative, albeit inconsistently and (as evidenced in current statistics) with insufficient overall application. Nevertheless, it is fair to argue that there has been an escalation in the development of workplace interventions in recent years, including the use of PA programmes, as part of wider governmental and corporate health strategies, and that evaluation, audit and more "conventional" research into such intervention has broadly confirmed its facility on a number of levels (Public Health England, 2014; Wills & Naidoo, 2016). While this broader body of evidence grows, however, rather fewer studies have investigated the use of gardening, horticulture or other related Green Exercise (henceforth GE) strategies in corporate environments. This would appear to be a significant gap in literature, given that the utility of GE modalities for health promotion and rehabilitation among service-users has now been well articulated across a range of settings, including hospital gardens, mental health services, schools, prisons, youth offending institutions and other secure environments, urban parks, allotments and housing developments (see Christie & Cole, 2016; Christie, Thompson, Miller, & Cole, 2016; Christie, 2017; Fieldhouse, 2003; Fried & Wichrowski, 2008; Mmako, Capetola, & Henderson-Wilson, 2019; Page, 2008; Pretty et al., 2007; Pretty et al., 2017; Rappe, Kolvunen, & Korpela, 2008). Similarly, GE has been demonstrated to have positive impacts upon the (particularly psychological) wellbeing of individuals within many classically disadvantaged groups, including older adults (Milligan, Gatrell, & Bingley, 2004), individuals in inpatient care (Wichrowski, Whiteson, Haas, Mola, & Rey, 2005), mental health service users (Christie & Cole, 2016; Kam & Siu, 2010), including individuals diagnosed with chronic schizophrenia (Son, Um, Kim, Song, & Kwack, 2004), immigrant families and refugees (Hordyk, Hanley, & Richard, 2015), people presenting with dementia syndromes (Gurski, 2004; Zhao, Liu, & Wang, 2020), children with behavioral disorders (McGinnis, 1989), adults with an intellectual disability (Sempik, Rickhuss, & Beeston, 2014) and adults in secure services with histories of offending behavior (Christie et al., 2016). A recent systematic review of studies addressing gardening activities in school settings, meanwhile, indicated that while current quantitative evidence is of low or inconsistent quality, stronger qualitative evidence speaks to positive outcomes, but largely for students who are already highly engaged in school-based activities (Ohly et al., 2016).

In the corporate sphere, Dugdill et al. (2008) found some tentative support for the utility of workplace PA interventions, although the systematic review of fourteen studies largely focused on walking schemes. The opportunity to relax and socialize within workplace gardens has been explored by Stigsdotter (2004), with strong positive impacts on staff mental and social wellbeing reported. Similar outcomes emerged from a comparable study of the utility of a rooftop garden at a corporate bank in the UK (Chance, Winterbottom, Bell, & Wagenfeld, 2015). In terms of more "active" interventions, meanwhile, Loeppke et al. (2010) used

gardening as one of several PA modalities introduced in a large-scale health-promotion programme (N=2606 participants) introduced across multiple employer groups in the USA. While overall findings indicate statistically significant reductions in the incidence of high-risk blood pressure, high-risk fasting blood sugar and high-risk stress after one year of involvement, the results do not outline the specific impacts of GE activities themselves. It is only recent work by Wagenfeld et al. (2019), addressing the impacts of short-term nature-based PA interventions on the emotional states of a set of N=22 employees of the American Occupational Therapy Association (AOTA), that reports a clear and contemporary GE-focused case. Using the *Interaction with Nature scale*, post-intervention results indicate with statistical significance that the participants were happier, calmer and more hopeful than they had been before the intervention.

It is clear, thus, that there is currently a paucity of research directly addressing the impacts of active GE interventions in corporate settings[1]. In these terms, the study reported in this paper manifestly aims to provide situated qualitative evidence that might contribute to the fledgling evidence-base relating to the efficacy of GE activities as, or as a part of, corporate health interventions and, perhaps more practically, the specific mediating and moderating factors supporting positive health outcomes.

Several theoretical positions of relevance to this study are worth noting here. The *biophilia hypothesis* suggests we have an innate, evolutionary affinity for the natural world, whereby being "hard-wired" or deep rooted biologically to nature ensured our survival, whether hunting, or avoiding being hunted (Kellert & Wilson, 1993). Although no "gene" for such an affinity has been identified, the increasing technologically driven society we live in has driven some people to find ways in which to connect with nature to restore themselves physically, emotionally, even spiritually. Research has demonstrated that active and passive immersion in natural environments, viewing nature, and biophilic designs within built environments can all facilitate lower stress and more positive emotional states (Ulrich et al, 1991; Stigsdotter, 2004; Lee, Lee, Park & Miyazaki, 2015). Given GE is "situated" in what are typically described as restorative environments, both stress reduction theory' (SRT) and 'attention restoration theory' (ART) are facilitated through engaging with activities in natural settings (Berto, 2014). Those seeking restoration from heightened levels of physiological stress (for example, pressures of work) or mental fatigue (demands of directed attention over prolonged time periods, such as working on important documentation) are essentially able to "reboot" through the soft fascination and involuntary attention afforded by flora and fauna, and activities associated with interacting with these. In an allied vein, Pretty et al (2017) developed the coincidentally-monikered *Green Minds* Theory, which posits that environments essentially shape our bodies and minds; in turn, our minds promote body behaviors, which influence our social interactions and connections, which can then facilitate enhancements to natural capital such as landscapes and the community environment. They propose we have a calming "blue brain", which facilitates rest and our ability to digest and reflect; and a "red brain" which is associated with an adrenalized driven emotional response to stressors ("fight and flight") – with a measured balance promoting optimal functioning. The workplace can be a context in which there may be too much stimulation of our red brains, through overloaded in-trays and pressure to meet deadlines. Having contact with nature, therefore, can help alleviate this burden and promote more blue brain functioning to help restore ourselves for the challenges of work (Pretty et al, 2017). As such, Green Minds Theory has much in common with ART and SRT as theories to both explain the problems people face in workplace environments, and the solutions that can help alleviate these stressors. Further, the theory suggests that the more connected we are to nature, and socially included, the more the blue brain is enhanced, whilst social isolation and too much exposure to biophobic[2] environments is associated with higher levels of red brain activity, and thus, potentially, ill-health (Kellert & Wilson, 1993).

[1] Although it not entirely clear whether this is a consequence of a lack of intervention on this level, or a lack of subsequent research into such interventions.

[2] Biophobia is typically defined as the converse of biophilia: exhibiting a dislike of nature in one's behavior; for example, a preference for man-made activities and environments, avoiding nature; actions which may serve to harm or undermine the natural world, whether intentionally or unintentionally. May have negative health consequences (e.g. climate change). (Kellert & Wilson, 1993).

Intervention: The Green Minds project

The Green Minds (henceforth GM) project was established in 2018 as a campus-based gardening initiative at a single campus (with around 450 staff) of a UK university. Aimed at reducing workplace-related stress by encouraging PA and engagement with nature on the campus itself, and working closely with the campus' Mental Health & Wellbeing Officer, the structure of GM sits comfortably within the American Horticultural Therapy Association (henceforth AHTA) classification of a social horticulture project (American Horticultural Therapy Association, 2017). During its initial 18 month (i.e. pre-COVID-19) run, GM was itself one of numerous wellbeing opportunities promoted by an inhouse Sport and Health Development Unit that also included keep-fit classes, gym, mindfulness sessions and health walks targeted towards the community of staff and any interested students. This unit, in turn, reported to the university's Senior Management as part of the broader corporate health strategy. In this respect the GM project was not so much a discrete intervention, but rather an integral part of an overall healthy settings approach (Wills & Naidoo, 2016). Sessions were "open access" for staff and students and scheduled on a twice-monthly basis by a project coordinator supported by a small steering group. This team produced an annual plan detailing potential projects to facilitate, such as developing a World War One Remembrance poppy display (see Figures 1 & 2); developing a nature trail; organizing a departmental "*Campus in Bloom Challenge*"; renovating disused and unkempt areas (Figure 3); developing an outdoor classroom space; and using cuttings or low-cost approaches to the development of flower beds around important landmarks of the campus, which had extensive amounts of greenery and a mix of modern and older (historic) buildings[3].

Figure 1. A poppy display in commemorating the 100th anniversary of World War One

Figure 2. GM group members working with Campus Estates staff

Figure 3. GM group members working on a new project

Each GM session typically operated for 45-60 minutes, supported by two staff members from the university's Estates Office, who supplied tools, gloves and wheelbarrows, as well as campus generated mulch and compost to encourage plant growth. Individuals engaging with the project participated for anything from 15 minutes to a full hour as part of a lunch break, and typically engaged in digging, raking, pruning, mulching, tidying, weeding and planting.

Across the full duration of the intervention,

[3] All participants in the GM fully consented to their unredacted images being used in presented and published outputs.

Table 1.
Participants

Pseudonym	Gender	Age	Years of Service	Role
Alison	Female	61	9	Support services
Georgia	Female	51	16	Administrative
Tina	Female	50	13	Support Services
Charlotte	Female	49	8	Administrative
Oliver	Male	45	11	Support Services
Heather	Female	55	18	Academic
Michael	Male	55	15	Support Services
	M	52.29	12.86	
	SD	5.19	3.72	

approximately N= 40 staff took part in GM in a variety of capacities and to a variety of extents. As outlined below, however, the specific group studied was considerably smaller, in line with the investigative approach taken.

Methodology

The research reported in this paper was designed to explore the impacts of the described GE intervention upon the senses of health and wellbeing of the involved staff. Given the importance of space, place, activity and experience within the design of intervention itself, an ethnographic approach inherently oriented to elucidating the "insider" perspective of participants (Christie & Cole, 2016; Sangasubana, 2011) was adopted. Furthermore, given the lack of extant research regarding the nuanced mechanisms that underpin reported health enhancements through GE modalities (Christie, 2017; Rogerson et al., 2020; Rogersen et al, 2016; Okvat & Zautra, 2011), the key ethnographic focus upon contextualized social process rendered it an optimal method in this particular instance.

Participants

Inclusion criteria for participation was set at being (a) university staff, (b) having taken part in at least eight GM sessions at the point that the formal research programme began (i.e. around one full working day), and (c) committed to taking part in GM in the immediately forthcoming weeks while data were being collected. Given the large amounts of qualitative data that are typically rendered per participant in ethnographic studies (Fitzpatrick, 2013), the maximum number of participants was set at N=8, given the viable scope of the project itself. With full institutional ethical approval, all participants who met the inclusion criteria were invited to participate and, within the viable window of engagement, N=7 mean age 52.29 volunteered. Table 1 describes this sample.

All participants that volunteered were provided with an Information Sheet detailing the aims, objectives and methods of the investigation, and a consent form. All fully consented to participate, and for their contributions to be part of any subsequent scholarly outputs.

Procedure

In order to facilitate the most seamless possible process of data collection, the first and second authors adopted an active participant role in the field, whereby they were regularly involved in the project over six months prior to data collection. Consequently, they were not only familiar with the GM structure and philosophy, but also developed a trusted rapport with all prospective participants in the research (Glesne, 1989).

The first tranche of data collection was designed to utilize a "reflect aloud" approach (Christie, Cole & Miller, 2020), adapted from the well-established "think aloud" model (Fonteyn, Kuipers, & Grobe, 1993). Herein, participants were encouraged to provide reflective commentaries on their self-selected GM activities while actively engaged with those very

activities. No formal interview schedule preceded this business; rather, a more organic form of interaction predominated in which participants were given the opportunity to provide honest accounts of what the activity meant to them, and the changes it had made (if any) in their working lives. Concurrent to the audio recordings of these data, the field researchers collected observational notes and photographic evidence to further contextualize them. Interviews were digitally recorded and ranged from 28 to 55 minutes in length.

The second tranche of data collection was originally envisaged as a set of face-to-face, reflective interviews while the GM project was still in progress. Given the COVID-19 lockdown in the UK at the pertinent moment, however, these interviews were then conducted online during the lockdown, with the added caveat that the participants were then reflecting on an activity in which they could no longer (for the time being) participate, rather than one which was ongoing. Interviews were digitally recorded and ranged from 25 to 45 minutes in length.

Analysis

All recorded interview data were transcribed verbatim by the first author. These transcripts were subsequently abridged by all authors to ensure that the identity of participants was protected in any reported outputs insofar as possible. Transcripts were then formatted by the first author through ATLAS.Ti v 8.4.24, using observational field data to augment initial interpretative notes. In this way, it was assured that further interpretation of data would not be without context.

Given the rich body of context-specific data available, the research team then worked together to draw higher-order themes from the annotated transcripts. Using the well-established Braun and Clarke (2006) standard, this process established five core themes, as described below.

Trustworthiness

Trustworthiness was monitored in line with the well-established standards determined for qualitative health studies by Yardley (2000). Triangular consensus validation (Patton, 1990) was organized through the three-way analytic process outlined above. As a further measure, and as a "credibility check" (Silverman, 2012), a preliminary analysis was disclosed to three of the original participants, who claimed full recognition of the issues therein. In order to maintain transparency and coherence (Yardley, 2000) all analysis is reported with reference to supporting observational and interview data; there is no extensive summary without evidence.

Findings

The five emergent core themes, and their interrelation with sub-themes, are outlined in Table 2.

These themes are discussed below, with direct reference to observational data and direct quotes from participants where illustrative.

Core theme 1: Escaping sources of stress

While indoor exercise options, such as the on-site gym and keep fit sessions, were available to staff in tandem with GM, the opportunity to simply be involved in constructive outdoor activity was universally deemed central to the attraction and benefits of the intervention. All respondents reported that GM afforded them the opportunity to "escape" from the routine contexts of work; this was typically framed in such terms as "stress release" (Tina), or a "release valve" and "headspace" (Michael) from indoor/office contexts. This opportunity to escape was not only reported as an individual benefit but was observed to be manifest in the collective behavior of participants during GM activities. This was corroborated by the participants themselves:

> Tina, tranche 1: *"[T]here's no negativity, no talk about not being happy in the office…it's all about what we're doing in the garden, you know."*

> Georgia, tranche 1: *"Funnily enough, we don't talk about work here, we talk about other things."*

Indeed, general social interaction about anything but work was recurrently observed to underpin the general business of participation. Each GM session typically began with a group discussion of what to do, how to do it best, and what an end-result might look like. As gardening activities proceeded, however, conversations cued by those activities and their natural surroundings would commonly emerge – an important consideration for research, given few studies shed light upon the specific aspects of "nature" that people have most affinity for. Here, for example, participants would chat about the plants themselves, things that had or had not worked in gardens at home, what participants' own gardens looked like, and favorite birds. The influence of each season was also a regular conversation piece, with the inherent challenges associated with each, for example leaf debris in the fall (autumn). Several rekindled childhood

Table 2.
Thematic linkage

Core Theme	Sub-themes associated with each core theme
1. Escaping sources of stress	Escape from work; restorative effects of activity; calming influence; stress reduction; affinity for nature; escape from indoor environment; nature as uplifting; 'being' in nature; fauna and flora; fresh air; childhood memories evoked.
2. Social connectedness	Meeting new people; co-operation; social interaction; talking to others; bonding and bridging capital; working with others; reduced social isolation; social engagement; teamwork; having fun together; laughter.
3. Deriving health and wellbeing benefits from engagement	Feeling more relaxed; stress relief; taking a break; physical fitness enhancements; feeling fitter; happier; better moods; tackling sedentary behaviour; positivity; changes to lifestyle behaviours; mental health benefits; more active.
4. Self-empowerment	Achievement; teamworking; making a difference; recognition; pride; satisfaction; enjoyment; having fun; protecting/enhancing natural environment; being resourceful; empowerment; being productive; contribution; being creative.
5. Exclusivity & Inclusivity factors in GM	Awareness of project; time/workload barriers; workplace culture and dynamics; perceived level of support from senior managers; workplace stress; negativity at work; sedentary work; quality of leadership; no obligation to attend; no experience necessary; varied, motivating autotelic tasks; healthy competition; concern for environment; proximity of project to working areas; no expertise required; resources available; alternative exercise option; scheduling.

memories of gardening with grandparents or other relatives, a point often noted by researchers examining connectedness with nature (Kellert & Wilson, 1993; Fretwell & Greig, 2019). On one occasion, gardening work was focused upon preparing a new border for a military dogs' cemetery (the campus itself being a former barracks). Conversations quickly developed around the breeds of dog were likely interred there, their names, what their duties might have been (active patrolling or more ceremonial), and also how few people on the campus were likely aware that the memorial existed at all. This, in turn, spurred conversations around participants' own pets; common ground upon which future interaction was based. As relationships within the group developed, broader topics of interaction would accompany the activities, with hobbies and holidays being particularly common.

> Tina, tranche 2: *"[S]omebody was telling me about their upbringing and stuff…[it] reminds people that there's more to [being at] work."*

In this manner, the GM's collective, nature-based structure provided participants not just with an escape *from*, but also an active escape *to*. The mood-enhancing properties of this, and attendant environmental comforts, during the working day were noted by all respondents, for example:

> Michael, tranche 1: *"[T]he pleasure of nature, the pleasure of birdsong, seeing animals, and understanding that complex ecology of the need for everything at a different level, and the balance of it…if everybody does a little something then lots of little somethings benefit; I think that's a key driver for me."*

> Charlotte, tranche 1: *"[I'm] definitely happier, more relaxed… it really makes people laugh, you stop for a second and think you're being ridiculous, and you think 'isn't it nice to just be'".*

> Tina, tranche 2: *"We come back more relaxed after it… we just have a cuddle, we want an excuse for a cuddle… it makes you laugh!"*

This was further evidenced by Tina (tranche 2), who spoke of how being outside made her *"feel happier… which for me is massive"* and that she was *"more motivated"* for the rest of the working day following GM participation. Alison perhaps captured the overall sense of satisfaction derived from "being" in nature, and

linking to the soft fascination experiences and associated relaxing "flow state" it can create (Csikszentmihalyi 2002; Hefferon & Ollis, 2006):

> Alison (tranche 1): *"It's the fresh air and… it's the organic nature of it, inside buildings everything is square and rectangular and out here everything is just wild and even if it isn't a wild place, the trees are just in different directions and it's a bit different… it's the diversity of it and there are so many different little creatures and birds and the more you look at them the more you realize what an amazing planet we live on."*

Indeed, took on the leadership of a GM nature trail development as a means of further sharing the escape-value that she herself had experienced:

> Alison, tranche 2: *"[S]o that's what I was trying to do with the nature trail really, share some of my enjoyment, and I think that's what takes me away from work, because I take such pleasure being outdoors and connecting with nature, it takes my attention."*

As the coronavirus lock-down ensued, however, it was interesting to note that significant efforts were made by senior management to promote virtually accessible health and wellbeing activities, health education and support networks to staff who were now in self-isolation. Tina organised her own response, by encouraging some GM members to take photos of their gardens to help lift employees' mood during lockdown, posted on the staff intranet. She also maintained contact with her garden project team to discuss ideas for when the lockdown was over. Respondents also mentioned that in lockdown they had also appreciated the option to simply go into their own back gardens whenever they felt the need to *"take a break"* - something they would not have felt able or comfortable doing whilst at the workplace. This short "breathing space" in the garden during the working day was viewed by participants as a useful chance to "reset" and re-engage with work in a more effective way, as posited by ART (Kaplan 1995). Tina (tranche 2) for example emphasized how much more productive she appeared to be at home compared to the office, hinting that the lockdown had proven very positive in that respect for her, as she was taking a lunchtime walk in countryside near her home and also feeling more connected to her immediate family. This enabled her to access more *"me time."* She expressed some anxiety about returning to the workplace once lockdown was over but was comforted by the fact that she could re-engage with GM when this happened. In fact, the need for *"me time"* was a common refrain from others who found GM provided an avenue for reflection and restoration.

Meanwhile, Alison, Tina & Georgia referenced the concerns they had of society becoming more *disconnected* from nature whilst recognizing the benefit they derived in respect of their mental health, for example:

> Georgia (tranche 2): *"I've got quite interested in how we're becoming cut off from the natural world and how that isn't really doing us a lot of good, and I think there is something about being in touch with the outdoor world and the seasons and with the cycles that actually… I think for me, I have bouts of depression, that's my mental health thing, I think it helps me feel that things will get better that everything has a cycle and stuff like in winter, lots of things die but then spring comes back…"*

It was noted by the researchers that all respondents expressed pro-environmental credentials whilst engaged in conversation, for example wanting to *"play my part"* in tackling climate change and supporting "green" initiatives, a finding noted by Cervinka et al (2011) in respect of people who feel more connectedness with nature. Interestingly, Fretwell & Greig (2019) found that females were marginally more connected to nature than males, with the strongest effect apparent within the 55-64-year-old age bracket. Although this sample's mean age was slightly below this threshold, the higher number of female volunteers involved in the study was representative of the wider GM participant group, and so the biophilic motive for engagement in GM may be an important contributory factor here.

Core theme 2: Social connectedness

As evident in theme 1, collective activity and mutual understanding were essential features of the GM intervention for participants. This in turn developed a sense of being more socially connected to colleagues with whom they may have only previously had formal telephone/email communication, or no contact at all despite close physical proximity. Progressively greater social engagement between participants was observed throughout the project, as previously noted, the specific value of which to them is further emphasized in the

exemplars below:

> Charlotte, tranche 1: *"[T]he gardening time is the only time I actually speak to people, because I spend a lot of my time on a telephone or staring and emailing, so some of the gardening team literally sit directly behind me, but I never get to turn around to talk to them for five (minutes) so it's [GM] time to socialize with my own co-workers."*

> Michael, tranche 1: *"[I]t gives you an insight into how [colleagues] feel and tick doesn't it, and I always think as well through doing that it helps you understand yourself a bit better as well, and how you come across [to others]."*

> Oliver, tranche 2: *"[I've] certainly got the opportunity to meet people that I didn't necessarily know… and now outside of GM if I bump into them in the cafes or on campus elsewhere, I'll say hello to them which… I'm not the kind of person who would say hello to every single person I meet but now I've got some kind of connection."*

Some participants articulated a more extended connection emergent of their involvement, enabling them to see their broader professional community (not just those involved in GM) as more than just names on an email, and/or feel engaged with a larger entity:

> Tina, tranche 2: *"[I]t's made me feel more attached to the University…more emotionally attached, because I've met different people… and it has given me more of a sense of identity at work as well, and led me to do other things like [campus-based] archery and rowing challenges, given me more interest and input to try and make work a bit more manageable in my head really."*

> Charlotte, tranche 2: *"I know the big managers have been feeding back, taking notice each time of how we're doing so it's nice, it's spreading a good word."*

Regarding the "upwards" relationship with the broader corporate structure, however, Charlotte (tranche 1) also impressed a lack of direct involvement in on-the-ground activities such as GM:

> *"I realize they wear suits, but they can change and there are showers on site and they can do it after work…I know they're very busy people, but they may find a benefit for themselves."*

Conversely, Oliver (tranche 2) suggested GM acted to "flatline" hierarchical roles, in stark contrast to his experience in regular work meetings where he might be reticent to challenge, or even discuss issues, with senior colleagues for fear of *"…being frowned upon if you speak out of turn"*.

Participants also emphasized "bridging" ties gained between different departments and services – not least the supporting Estates staff – with whom they may not have otherwise had any direct social or professional contact:

> Georgia, tranche 1: *"[I]t's been nice to meet new people that I didn't know before…and you know [GM leader's name redacted]'s enthusiasm and energy is really infectious and [he] is really encouraging and positive about giving things a go, and before Christmas I'd sent a Christmas card to [him] to say you know thank you for the involvement with the Green Minds because it felt like it was one of the best things I did last year."*

> Charlotte, tranche 1: *"I've found people on their lunch [break] would stop and talk to us because it was inspiring them from other areas [of the campus]."*

Further, *outside of work*, two respondents had been inspired enough to be volunteering with community garden groups in their own residential areas.

Core Theme 3: Deriving health and wellbeing benefits from engagement

The value of GM as a vehicle for enhancing personal health and wellbeing was a point of reflection for all respondents. The intervention, clearly, was in no way designed to provide a "complete" programme of physical exercise for participants, given its episodic nature (one hour per fortnight). However, participants routinely addressed how the activities therein (a) had provided the less physically active among them with an accessible model for getting fitter, or (b) had provided the more physically active with an inherently enjoyable augmentation to their extant exercise.

With respect to the former, several participants who were not "turned on" by sport, or going to a gym, nevertheless found creativity and sense of purpose in the

variety of activities offered up by GM. These often gave rise to active choices made around broader lifestyle.

Alison (tranche 2), moreover, referenced the "good feeling" associated with delayed onset of aching muscles the day after "a long stint of digging," and reported that she was surprised to find the physicality of gardening could be "addictive" in itself. Georgia, meanwhile, had yo-yoed between being "fit" and "immobile" over the years, veering towards the latter at the time of her involvement in GM.

> Georgia, tranche 1: *"When I first started [GM] I was unfit, I've got some problems with my knees and I had an arthroscopy… so I'm quite stiff, but it really pointed out to me how immobile I had got and how sedentary I was. So since getting involved I have been a bit more active, looking after myself a bit better, I've lost a bit of weight, I'm eating better again and looking after myself better so it feels like it's really helped me do stuff like that more."*

Regarding the latter, more active participants highlighted that the gardening clearly did not offer the same intensity as a jogging class or a spinning class, but engagement with lower-intensity outdoor PA in a relaxed and friendly atmosphere provided a psychologically pleasant outdoor extension to their more competitive and/or demanding gym work. This position was particularly strongly articulated by Charlotte (tranche 1), who highlighted that PA with her own medical condition was assisted through the calming influence of gardening activities:

> *"I take a lot of medication and [the condition] still seems to be quite lazy, or I will get an extreme heart spike where I will start to race so I can go either way and so [GM] is just calming, and you know when you can go back and you think 'oh, the sun is shining', [or] in the rain, okay not so great sometimes but even that…it's nice to be outside even for a few minutes and see how that goes really."*

Meanwhile, Oliver (tranche 2) enthused about how GM and his own domestic gardening efforts made him feel much more positive following a difficult period of mental ill-health. Further, all respondents spoke at length of hedonic related impacts such as greater life satisfaction, happiness and pleasure from GM participation, as well as feeling generally more satisfied with their working lives compared to *pre-GM* days.

Core theme 4: Self-empowerment

A canonical matter to emerge from the collected data was self-empowerment provided by involvement in the GM intervention. A sense of having improved a corporate environment for all was *leitmotif* here, with an autotelic dimension having a recurrent corollary impact upon self-efficacy. All respondents reported a range of essentially eudemonic impacts, including the sense of pride associated with achieving something tangible as a result of their involvement, with terminology such as "giving something back," "making a difference," "contribution," "being productive," "helping out" and "working as a team" prominent in their articulation of experiences during the project. Michael, Tina & Charlotte referred to the office photographs of their garden *"achievements"*, in that:

> Tina (tranche 1): *'…we take photographs at the end of every session now and we print them out and we put them in the kitchen so that other people can (see them)."*

This was also a source of merriment as one male member was always prominent in their photos yet was recognized for not contributing much to each session.

Some participants simply found empowerment in having done exactly what they did, in the business of the gardening activities:

> Michael, tranche 1: *"It's not just the physical activity, yeah, it works on so many levels…for me on a creative level and artistic level thinking about colour, shape and structure but also that therapeutic feel, the joy of planting something, watching it grow, develop – or not! And trying to understand why if it doesn't happen and yeah…that's the joy of [this] gardening, the strength of gardening, definitely for me anyway. So, I've got this artistic bent that needs an outlet to come out [at work]."*

> Georgia, tranche 1: *"It's such a lovely campus, you know, you think about some work environments people have, they're quite concrete jungly, and this is such a nice environment, so to help contribute to it and maintain it feels like it's a good thing to do."*

On many occasions the researchers witnessed participants discussing plants that supported bees, butterflies and other insects, or conjecturing how best to propagate or prune established plants to maximise their

flowering over the current or following season. This was often a source of new ideas, or a chance for knowledge acquisition (Wakefield et al, 2007; Okvat and Zautra, 2011), given several respondents were still just acquiring their "green fingers" credentials:

> Charlotte (tranche 2): *"…I've got some things, they're flowers, purple, but others consider them weeds, but I will not touch the garden while they're in bloom, they're so beautiful, so until they get a bit shabby looking… I do all sorts now, because of things people have said, that I haven't, or didn't know, or didn't try before, whereas I even trim and tie things back. I've three rose plants, and they've come up with even more flowers this year, and one is massive, it's literally taking over one side of my front garden, I'll have to pull it back and tie it back before it attacks everyone! So yeah I'm quite impressed whereas once upon a time I wouldn't have even attempted to tackle something especially like a rose bush or something…"*

In other cases, the prime determinant of empowerment emerged from observation and feedback relating to how others were now using, and indeed enjoying, the renovated spaces. Georgia (tranche 1), for example, reported how outdoor classes were now being held at one of early sites that GM addressed (as further corroborated by author observation), and giving positive feedback:

> *"It feels like people have really noticed changing that and using that space more…and that feels like a really nice thing to have been involved in and making that little 'stonehengy' thing with [colleague's name], that was hilarious, just throwing some rocks together and give it a go."*

This sense of accomplishment resulting from the various GM challenges offered up throughout the year, and recognition of labors by others within (and indeed without) the campus community, is viewed as an important outcome of community gardening activity (Infantino, 2004). In terms of the empowerment that might be gained from corporate feedback, however, the participants' accounts were rather more mixed. All participants reported consistently strong support and encouragement from immediate line-managers around the gardening work they were doing, and the value it had for working spaces.

> Tina, tranche 1: *"[My line manager is] really pleased that her team are representing her department well in this."*

Direct interest in initiatives such as GM from senior management was, meanwhile regarded as intermittent at best (see the reflections of Charlotte documented in Theme 2). Such support was ultimately viewed to be unnecessary, however, within a grassroots project such as GM wherein the empowerment of participants was largely deemed an emergent phenomenon:

> Tina, tranche 2: *"Everybody can lead and we can all do it… and we shouldn't be relying [on] the people at the top to tell us what to do for our own good."*
>
> Charlotte, tranche 2: *"We should inspire ourselves."*
>
> Alison, tranche 2: *"That sense of ownership that people will have their own little bit of land, that they can sort of relate to and feel that they have got some choices over."*

Core theme 5: Exclusivity & Inclusivity factors in GM

An undercurrent in all interviews and in both tranches was the matter of exclusion. Although often handled within a "limitations" section of a project, issues of access to the intervention were raised by some participants themselves. Here, it was very apparent that participants were willing to get involved, even on the basis of minimal information about the GM project. Their participation was reinforced by a number of access issues, such as the enthusiasm of the group leader, the simplicity of the project, the task options available and the ability to access the project during a lunch period, even for as little as 15-30 minutes:

> Georgia (tranche 1): *"…I just knew I needed to do something different and I think I'd spotted this or maybe seen (people) involved and I'd heard about it, and I'd seen the photographs, and I just thought that would be a way of getting away from my desk, being outside, doing something that's not work related."*

Michael (tranche 1) however wondered if some people might be anxious about attending a group project, particularly if they did not know anyone or knew little about what it entailed, and so, as others suggested, there was a *"challenge for us as a group…to see how we can widen that participation to others"*.

The pressures of work were cited by several respondents as having an impact upon their desired participation, and the regularity of their attendance during the intervention, despite meeting the criteria for inclusion in the project. This was reported to have potentially counter-productive outcomes. Heather, for example, illustrated how she derived benefits from GM when she felt she had actual time to engage. Otherwise, and somewhat perversely, participation actually increased her workplace anxiety because she would then need to make up time lost for pressing work priorities, although she recognized she was somewhat culpable in not taking sufficient rest breaks as a matter of routine. As a senior member of staff, Heather also outlined how in her more formative years at the university, there had been a "culture for taking a break," where a common room had been available for everyday socializing, but that closed down some time ago. She explicitly argued (tranche 1) that *"We have lost the habit of taking a break, which I think is wrong and sad."* However, whilst there was consensus around the pressures of work, most respondents either made sure GM sessions were diary-entried or confirmed with others about rescheduling where necessary to "make time" for the project – and, importantly, themselves:

> Michael (tranche 1): *"[So] it's the pressure that all of us have to work under, you need that release valve to do that, force you almost to go and have a break, because once you commit to something, and certainly someone like me, if I've booked it I'm committed to it, it drives you sometimes. I mean some weeks I might say I've got too much to do, I can't really spare the time or whatever, but because it's there as a slot, I'm more likely to make it a priority and make the time for it you know so rather than just leave it."*

There was also tacit recognition that line managers were supportive of employees taking a break but also representing their department in contributing to renewing the campus aesthetics. Field notes compiled during early phases of the GM project confirm that for many staff at the target campus, the opportunity to be involved in such activities as GM may remain a luxury at best for some employees. More positively, however, as the project became more established, and included for the first time an organised competition akin to the national RHS "Britain in Bloom", participants who could be involved spoke of the design of GM as facilitating inclusivity, and that these factors could at least counterbalance some of the exclusivity factors noted above. Simply being able to experience "being" and "doing" nature-based activities was a major driver for respondents, although some recognized that bad weather could reduce participation especially during the winter months. Respondents added that the project included a range of activities to suit different capabilities, knowledge and fitness levels; that it offered both very active as well as more "gentle exercise"; it was an on-site opportunity and thus "easy to get to"; no expertise was required; there was flexibility regarding "time on task", thus being able to insert into a busy schedule (despite caveats above). Heather & Alison also felt it plugged an important "gap" in the campus opportunities available to staff, as opposed to keep fit classes, sports or using the on-site gym:

> Alison (tranche 2): *"I think it [GM] does because I wouldn't do any of those other ones… I wouldn't do a purely sport and fitness thing… I wouldn't be going to that… none of those appeal to me but Green Minds does… it's maybe the creative side of it or just because I like gardening… I suppose the more varied a range of activities you can offer the more likely you are to offer something that appeals to them [employees]."*

Oliver (tranche 2), meanwhile, contended that the legacy of the GM group through enhancements such as the nature trail on campus would facilitate more staff engagement:

> *"[W]e could do with a nature trail around the campus and stuff, because that will give you the opportunity to go 'oh right I'll go and see the bird box' or 'I'll go look at the lavender' or whatever it might be that particularly interests."*

Heather, Oliver, Alison, Tina & Charlotte (tranches 1 & 2) were all vocal in suggesting senior management could lead from the front in terms of visibly supporting initiatives, and properly resourcing opportunities such as GM, especially given the benefits that could accrue to the university:

> Heather (tranche 1): *"… there's possibly a lack of understanding…about organisational health… that maybe it's having the right experts leading that aren't there… but actually the benefits are much wider if you can get corporate health strategies to*

work effectively; then actually you reduce sickness absence, you can increase productivity… and there is a direct correlation that if you've got happy staff you've got happy students… but that isn't being identified by the people that need to identify it to ensure it (happens)"

Rather damningly, Heather (tranche 1) added: *"I don't actually believe we've got a proper corporate health and wellbeing strategy"* and bemoaned the fact that although she was one of a network of departmental health advocates within the university, the advocates met infrequently, and even when they did there seemed to be little in the way of productive output, and a perception of inaction or indifference from senior management chairing the meetings.

Discussion

Participants in the extant study documented numerous enhancements to personal fitness, health and

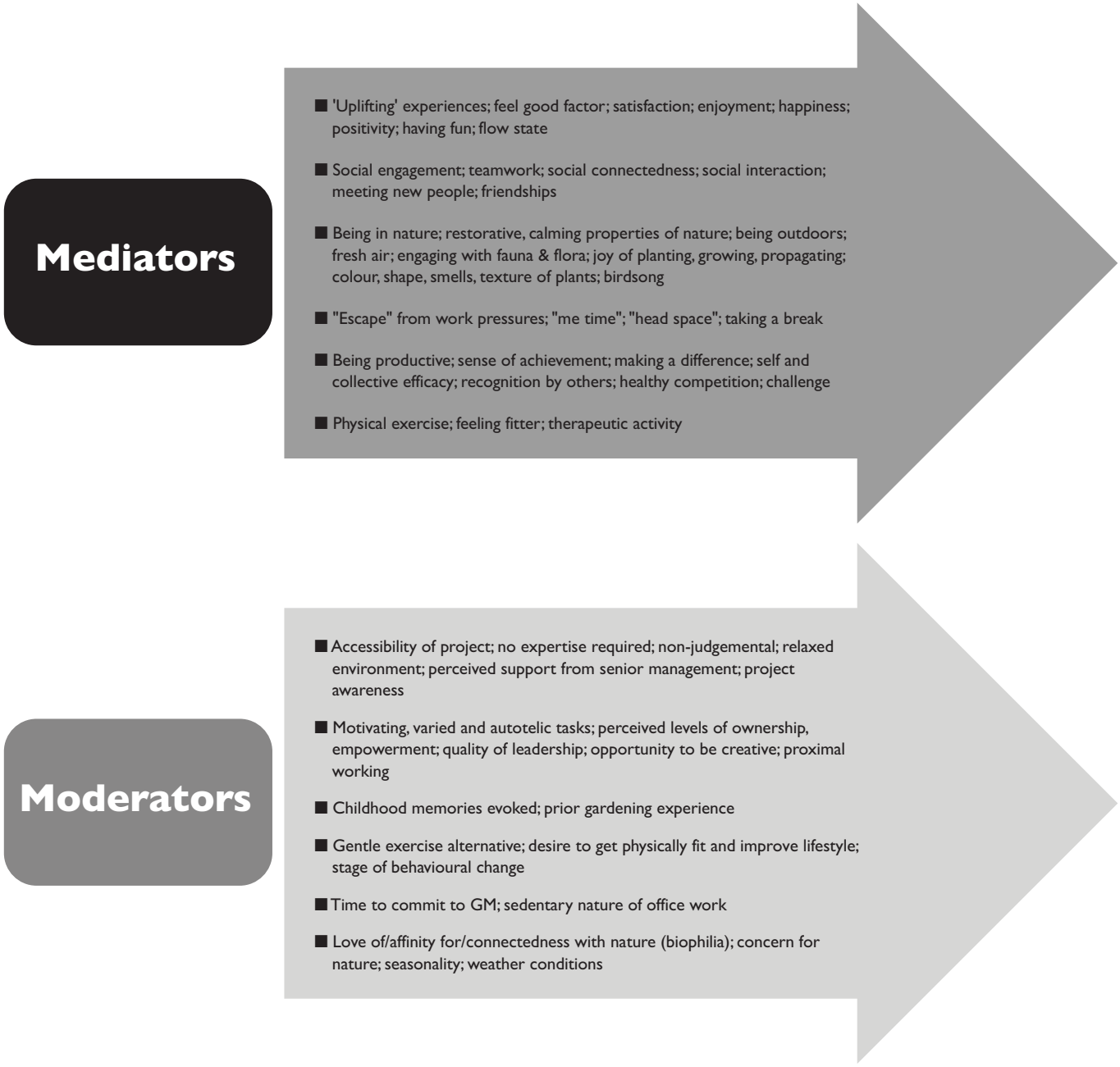

Figure 4. Details of mediating and moderating influences

wellbeing, as well as positive impacts regarding their sense of personal agency, and increased social capital. Undertaking the gardening activities embedded in GM therefore appeared to bestow wide-ranging physical (Nicklett, Anderson & Yen, 2016; Soga, Cox, Yamaura, Gaston, Kurisu & Hanaki, 2017) and psycho-social benefits (Clatworthy, Hinds & Camic, 2013; Guerlain & Campbell, 2016). The latter, in particular, was an artefact of undertaking GE as part of a group, whereby the inherent social interactions fostered motivated further engagement, and helped the participating individuals develop new networks of personal value – in short, they built social capital (Putnam, 1995; Somerville, 2011; Yotti, Townsend & Townsend, 2006).

The underlying mechanisms and processes for the benefits articulated by the participants were also derived from the transcribed data. are developed with specific examples in Figure 4, although obvious cautions apply in respect of generalizing findings from a small-scale, qualitative study. Mediators help explain the links between the engagement with the project and the health-related outcomes participants' testimony suggested flowed from their participation – the *why and how*. Here these include the emotive response to *"being"* in nature and its restorative properties, a mediator also hitherto noted by Gladwell et al (2013). Moderating factors however further articulate the strength of a relationship – whether the relationship is enhanced (for example, as a result of easy access to the project) or undermined (barriers that mitigate against involvement: time, work priorities or bad weather). \

Reported physical and psycho-social health

Figure 5. GM advertisement

enhancements appeared to be derived from the motivational nature-based tasks with which participants engaged, whether light or more strenuous in character. Indeed, gardening activities need not be of high intensity in order to be beneficial to health (Hartig & Marcus, 2006). Researchers corroborated participant testimonies, observing the genuine positivity with being out in nature, the fresh air, the sights, sounds, smells and good "vibes" people appeared to consistently refer to with the gardening activity, and the value attached to *escaping* the stress-inducing factors associated with the office. Connecting with nature in such a way can be the perfect conduit for stress reduction, as posited by SRT (Ulrich et al, 1991), and in restoring attention for essential tasks, such as office-based responsibilities, as noted in ART (Kaplan, 1995). The mind needs "down-time" from continued directed attention on tasks otherwise exhaustion sets in; and with exhaustion, people typically experience heightened levels of stress. The findings herein indicate that activity around nature offered a calm, restorative setting where effortless, indirect attention to the natural world helps replenish levels of concentration to more optimal levels of functioning. This effect has similarly been referenced in many studies involving GE (Berto, 2014; Bragg & Atkins, 2016; Van den Berg & Custers, 2011), facilitated through a *flow experience* (Csikzentimahalyi, 2002) hitherto noted in studies with other physical activities including dancing (Hefferon & Ollis, 2006). Whilst prior studies have demonstrated that some urban environments can promote restoration, including art galleries and museums, there is general consensus that "natural" environments (however these may be defined) offer the optimal conditions for restoration given their low arousal properties (Mackay & Neill, 2010).

The earlier sentiments expressed by respondents regarding feeling disconnected from nature, driven to a large degree by their working lives, are reflected in observations made by Loureiro & Veloso (2017) who assert that urban life promotes such disconnect, with a consequent rise in stress levels and reductions in good health. Green exercise may therefore be an important solution to tackling sedentary behavior and the ill-health that is associated with more biophobic environments and ensure better physical and psychological health, and quality of life, outcomes (Kellert & Wilson, 1993). Here, respondents spoke of the year-round interest derived from spring flowers, autumnal colors and the stark contrast of winter flower borders, and how, through an appreciation of what each season offered, GM participation facilitated positive mood states and greater satisfaction with their employment. A meta-analysis conducted by Capaldi et al (2014) demonstrated that life satisfaction is much higher amongst those who are more connected to nature. Further, Thompson Coon et al (2011), in a systematic review, found people reported greater levels of satisfaction and enjoyment derived from outdoor activity, with an enhanced disposition to repeat their involvement on further occasions.

Similarly, Myers and Diener (2018) proposed a model involving four traits associated with the happiness and enhanced mental wellbeing derived from greenspace activities, notably extroversion; optimism; personal control and self-esteem. These traits appeared to be echoed by the experiences of the participants in this study, whereby respondents felt comfortable with the GM environment, for example in working with people whom they had either infrequently - or never - met previously. They also referred to the "positivity" associated with GM engagement, and an enhanced sense of personal agency derived largely from the empowerment associated with developing their "own" garden projects within the remit of GM. Further, participants gained real satisfaction from the varied, autotelic activities they engaged with. Similar findings were noted by Fretwell & Greig (2019) regarding nature-related hobbies that promoted enhancements in positive affect including self-efficacy and happiness. Here, the researchers were often struck by the sense of "legacy" people felt they were leaving through manifest enhancements to the campus grounds, suggesting an impact well beyond the personal was being fostered through the collective GM endeavours. As Charlotte (tranche 2) suggested if, at a future point, she left the organisation, *"[Y]ou do think the idea that there is a little part of me, that I could move on somewhere else, and could still be here is quite nice."*

Mental (and social) health improvements were evidently positively influenced by the social interactions associated with GM. Typically participants worked in pairs, or small groups of three or more, exchanging "banter" about a whole range of issues, rarely work-related, and promoting knowledge exchange on plants and wildlife in the process. Such social interaction and group dynamics are viewed as a key feature of GE (Peacock, Hine & Pretty, 2007), and also as useful stress buffers (Milligan, Gatrell & Bingley, 2004), whilst the social connectedness

that results from such a supportive milieu fosters continued engagement, further strengthening the ties within a group (Wakefield, Yeudall, Taron, Reynolds & Skinner, 2007).

The quality of the leadership of the group was highly valued by respondents as having engaged them in the first place as well as continuing to encourage them to participate and develop their own garden projects. Having "corporate health champions" or advocates for health within the workplace are important considerations for employers in terms of implementing any workplace PA interventions (Wieneke et al, 2019). People with appropriate motivational, interpersonal and communication skills are essential in raising awareness of opportunities, but also in showing the lead in motivating engagement (Englefield, Black, Copsey & Knight, 2019). Equally, empowering employees through consultations as part of a broader employee engagement strategy designed to enhance wellbeing - that includes PA options amongst a range of other activities such as health education and health MOTs – creates the motivational climate to facilitate positive outcomes for both employer and employees (Public Health England 2014). Here, there was a tangible sense of empowerment, manifested by the generally "bottom-up" approach to designing new projects for GM participants to be involved with. However, employees did value senior managers taking an interest, although this was characterized as somewhat piecemeal and intermittent, and symptomatic of a less than effective corporate wellbeing strategy. As part of a wellbeing menu of activities, packaging the gardening activity as an "alternative workout" may entice others to "give it a go," as part of a menu of wellbeing activities including group health-walks that several of the GM participants also attended, although some respondents such as Oliver, Heather, Alison, Charlotte & Tina felt efforts needed to be better coordinated across the university to popularize projects such as GM and facilitate their sustainability.

Participation in any form of PA hinges on an individual's readiness to change behavior, as suggested in the Trans-theoretical Stages of Change Model (Johnson et al, 2002; Prochaska, Redding & Evers, 2002). If people are *prepared to change*, they will more likely engage with an exercise intervention. Getting to the point of preparedness, and then converting this into action, needs the right sort of encouragement, including, in this study, how the GM opportunity is promoted to the campus community. Here, GM was advertised via staff intranet, through distribution of posters (example, Figure 5) by volunteers, and through the now established corporate health champions network.

As Gladwell et al (2013) note, people are motivated to

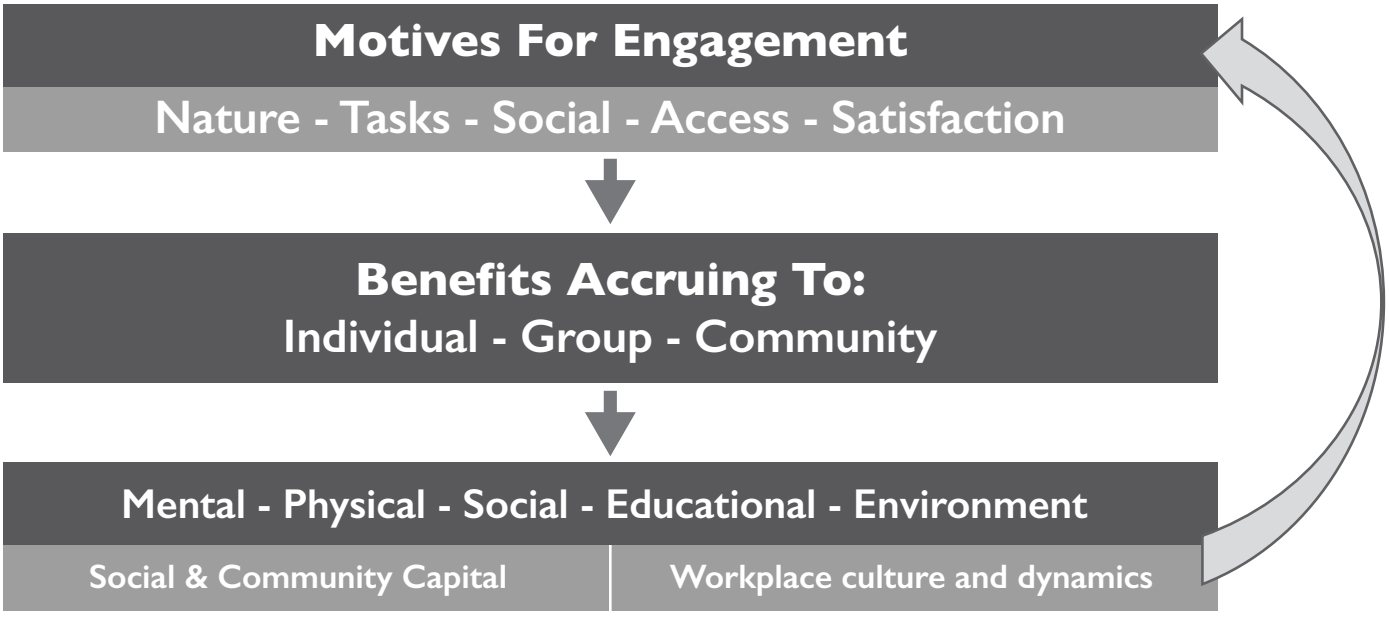

Figure 6. Motives and benefits

exercise for many different reasons, whether to lose weight, socializing, excitement, challenge, escapism, or just for fun, amongst other motives – and so opportunities such as GM and other PA workplace interventions need to be aware of the varied motives people have for participation - whether intrinsically or extrinsically driven – in the way activities are promoted (Dugdill et al, 2008). Further, it is extensively documented that physical activity is good for holistic health benefits, and, similarly, that immersion in natural settings supports physical and psychological health; thus, Mackay & Neill (2010) argue, the combination of these two *ingredients* can make for a potent work-based intervention.

Limitations and future directions

The study's findings represent insights into a *specific GE context and group*, and so there is a case for similar work in other corporate settings in order to further appreciate the effects of interventions such as GM, including understanding how such initiatives can become more effective health and wellbeing vehicles for employees, and the barriers that mitigate against participation. Although demographic factors such as age, gender, medical status, employment status, social class and ethnicity may also influence how forms of GE are experienced in workplaces, the evidence thus far within the broader GE literature, according to Pretty et al (2017), suggests little difference between an array of population groups and indeed, settings and types of GE. Nonetheless, other forms of workplace GE could be investigated, for example walking programs. Further, workplaces that have less "natural" compared to artificial or built amenities could be explored to evaluate whether settings with lower "greenness" levels can facilitate positive impacts.

Whilst the participant numbers involved were appropriate for an ethnographic inquiry and were representative of the wider GM participant base on campus, it is acknowledged that the small-scale nature of the investigation mitigates against generalization of the findings herein. However, it is perhaps for the research audience to decide for themselves the broader applicability and relevance to practice of the understandings derived from this specific context, GE mode and participant group (Knight, 2002; Somekh & Lewin, 2009; Savage, 2000).

It should also be noted that the onset of lockdown as a result of Covid-19 clearly impacted upon the use of follow-up interviews in the field as originally proposed. However, whilst this meant a change in the way in which data was collected, it also provided a different lens for participants to reflect and review their engagement with the gardening project. The use of subsequent interviewing was originally conceived to both confirm data from the first tranche but also to probe any gaps in testimonies; however, the first tranche provided rich, detailed and highly reflective accounts in themselves. Thereby the different circumstances produced by the coronavirus outbreak arguably added more value to their collective reflections, given their inability to access the project whilst in lockdown. As noted in earlier testimonies, participants made efforts to keep their GM interactions alive through sharing of photographs and domestic gardening, demonstrating the strength of the collective social bonds produced thus far, and the knowledge acquisition that had occurred to that point.

This study raises the possible association between nature-based group activity and its concomitant impacts on staff health and wellbeing, with potential cost savings to employers. Whilst the latter was not investigated here, the strength of this link merits further investigation as it could provide a useful blueprint for corporate health strategies.

The research presented here seeks to contribute to providing insight into the possible mediating and moderating factors underlying GE health benefits, but more needs to be done in this respect to "plug the gap" in the research literature (Lachowycz & Jones 2013; Gladwell et al, 2013; Rogersen et al, 2020). Similarly, there is a need for more qualitative, ethnographic inquiry to assist this process.

Conclusion

In summary, as illustrated in Figure 6, it appears that the attractiveness and accessibility of the project, as noted by participants, facilitated their engagement and continued participation, which in turn drove benefits not only accruing to individuals, but a shared experience that helped connect people and enhance the overall environment for the campus community (and its many walk through passers-by).

These benefits were wide-ranging, from physical and mental wellbeing, to raised levels of social (bonding, bridging with internal partners) and community

(enhancements to campus landscape) capital, and becoming a prominent contributor to efforts to raise campus vibrancy and promote a healthier workplace through the conduit of the sport & health development unit. The benefits derived in turn reinforced the motives for continued engagement by participants. As further posited by Green Minds Theory (Pretty et al, 2017), benefits can extend beyond the individual. Christie (2017) suggests this is akin to a *"green transformative ripple effect"*, whereby positive impacts can accrue to individuals (health and wellbeing enhancements), groups (social connectedness) and communities (improvements to wildlife habitats). Having options that might appeal to those not attracted to traditional indoor forms of PA and sport is essential in order to encourage employees at risk of sedentary lifestyles to participate (Thøgersen-Ntoumani & Fox, 2005).

Equally, a network of motivational leaders in the form of health advocates across a workplace may facilitate positive engagement if harnessed effectively (Wieneke et al, 2019). Whilst it must be recognized that not every employer will have the capacity to offer a full range of PA opportunities, simple changes, especially when developed with employees as part of a PA 'offer' (UK Faculty of Public Health, 2006) might facilitate changes to behavior, such as providing changing and shower facilities for those travelling to and from work or taking a run at lunchtime; and, in respect of gardening, providing a small area to propagate plants, even on a rooftop if necessary (Chance et al, 2015). If a fire brigade can find a way to use plant therapy in an emergency working environment (London Fire Brigade 2017), it cannot be beyond the whit of employers to identify and deliver similar offers.

Recommendations

Hitherto, few studies in this field have employed an ethnographic approach in seeking to *get under the skin* of the oft-reported beneficial health outcomes associated with these kinds of GE projects (Rogersen et al, 2016; Rogersen et al, 2020). Further considered use of imaginative, more sophisticated qualitative frameworks would be useful to provide more insight into the mediating and moderating factors involved.

For employers, it would appear that a positive commitment to providing GE-related PA opportunities such as GM – ideally as part of a wider public health and urban planning approach - can have positive impacts upon employee health and wellbeing, and help to promote a happier, more motivated and productive workforce (Public Health England 2014; Loureiro & Veloso, 2017). As part of a 'bundle' of interventions, GE may appeal particularly to 'non-sporty' types and those not interested in indoor exercise options.

In summary, this paper argues that it would be erroneous for employers not to make healthy workplaces a strategic corporate priority to improve employee wellbeing. Simple initiatives such as GM involving light to moderate intensity PA could help reduce sedentary time amongst employees as well as restore directed attention and reduce stress, whilst reciprocally improving business performance (Pronke & Kottke, 2009; UK Faculty of Public Health, 2006;), Thus, better employee health can equate to a better, smarter business model.

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BIOGRAPHY

Mark Alan Christie, MA - Mark's career background includes many years as a sports facility manager and sports development officer in the UK, facilitating a range of sport and health-related programs for specific target groups. Mark is currently a Senior Lecturer in Sport Development at the University of Cumbria and has contributed three previous research articles to JTH (see Volume 26 (1), Volume 26 (2) and Volume 27 (2)). These represent his increasing research profile in investigating the health impacts of specific forms of 'green exercise', which together will be featured within his current PhD contribution to this rapidly increasing field of interest.

Dr. Paul K. Miller is an Associate Professor of Social Psychology with a specialization in qualitative approaches, particularly conversation analysis and discursive psychology. Although his primary substantive domain of research remains in medical communication and mental health, he has also recently published on a variety of broader phenomena in health and/or language, including dementia in radiographic contexts and staff wellbeing in clinical ultrasound. Some of his recent publications include: Miller, P.K., Booth, L. and Spacey, A. (2019) 'Dementia and clinical interaction in frontline radiography: Mapping the practical experiences of junior clinicians in the UK', Dementia, 18(3), pp.1010-1024, and Miller, P.K., Waring, L., Bolton, G.C. and Sloane, C. (2019) 'Personnel flux and workplace anxiety: personal and interpersonal consequences of understaffing in UK ultrasound departments', Radiography, 25(1), pp.45-50.

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